



Snack and Cold Drinks Vending Machine

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ABSTRACT:

A vending machine is a machine which dispenses items such as snacks, cold drinks, chocolate, consumer products to customers automatically, after the customer inserts currency or credit into the machine. Nowadays, Vending Machines are well known among Japan, Malaysia and Singapore. The quantity of machines in these countries is on the top worldwide. This is due to the modern lifestyles which require fast food processing with high quality. This paper describes the designing of Vending Machine with Auto-Billing Features. The objective here is to design Vending Machine Controller which accepts money inputs (*i* and *j*) in any sequence and delivers the products when the required amount has been deposited and gives back the change. It is possible to withdraw the deposited money in between if the customer wishes so by pressing a push button.

Vending machines are commonly used to disperse beverages and snack items, but in recent years companies have introduced vending machines that disperse other items, even including electronic items such as digital cameras or iPods.

INTRODUCTION:

Vending Machines are used to dispense various products like chocolate, Snacks, and Cold Drink etc. when money is inserted into it. The first commercial coin operated machine was introduced in London and England used for selling post cards. The

vending machines are more accessible and practical than the convention purchasing method. Nowadays, these can be found everywhere like at railway stations selling train tickets, in schools and offices vending drinks and snacks, in banks as ATM machine and provides even diamonds and platinum jewelers to customers. Previous CMOS and SED based machines are more time consuming than the FPGA based machines. The FPGA based machine is also more flexible, programmable and can be re-programmed. But in microcontroller based machine, if one wants to enhance the design, he has to change the whole architecture again but in FPGA user can easily increase the number of products.

In this paper a new approach is proposed to design a Vending Machine with auto-billing features. The machine also supports a cancel feature means that the person can withdraw the request and the money will be returned back to the user. This machine can be used at various places like Hotels, Restaurants and food streets. This reduces the time and cost.

Operation of Vending Machine:

- I. When the user puts in money, money counter tells the control unit, the amount of money inserted in the Vending Machine.
- II. When the user presses the button to purchase the item that he wants, the control unit turns

on the motor and dispenses the product if correct amount is inserted.

III. If there is any change, machine will return it to the user.

IV. The machine will demand for servicing when the products are not available inside the machine.

DESIGN METHODOLOGY:

The state diagram mainly consists of four states (User Selection, Waiting for the money insertion,

product delivery and servicing (when `product_not_available='1'`)). Initially when the reset button

is pressed, the machine will be ready for the users to select the product. This state is the initial

state of the design. After this the user will select the product to be dispensed. This state can be

one of the select1, select2, select3 and select 4. The machine can accept only two types of notes

i.e. rupees 10/- and 20/-. Let us suppose that the user selects sel1 input. The machine will firstly

check that whether the products are available in the machine or not. After this the control unit will

move to the waiting state, where it will wait for the money to be inserted. Then if rupees 10/- note

is inserted then the machine will go to state_1 and wait until the desired money is inserted.

And if

rupees 20/- note is inserted the machine will move to state_2 and then wait until 30/- rupees are

inserted to the machine. When the desired amount is inserted the machine will go to the snacks

state and snacks will be delivered at the product output. If products are not available in the

machine then the control unit will demand for servicing and after service the machine will get

reset. This methodology is explained using a flow diagram shown in figure 3.

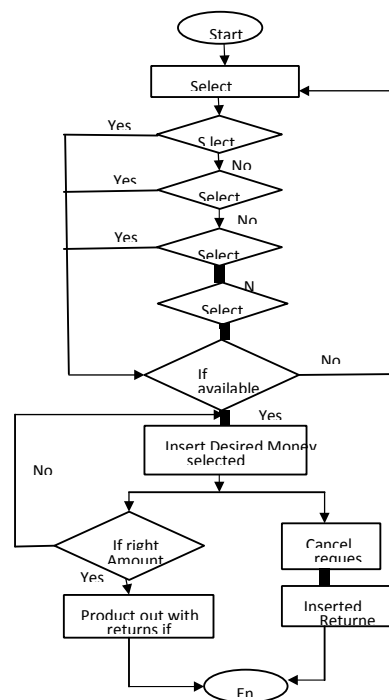
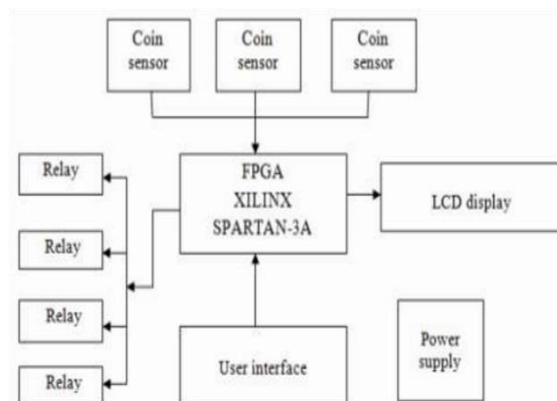


Figure 3: Flow Chart for

Proposed Vending Machine

Block diagram:





EXPLANATION :

In Fig 2, the machine can accept the coins of one rupees, two rupees and five rupees in any possible sequence. There are coin slots and it commonly connected to the FPGA. User interface is used for coin dispense and product dispense. Relay is used to control the product dispatch. The program has written on KCPSM3 processor and downloads into the FPGA Spartan-3A kit by using ELBERT configuration for selecting products, coin sum and balance and it will be display on LCD.

XILINX -3A FPGA

The development board features Xilinx XC3S50A 100 pin FPGA with maximum 68 user IOs. USB2 interface provides fast and easy configuration download to the on board SPI flash. ELBERT features a stable clock source which is derived from on board configuration controller. ELBERT incorporates LEDs and switches for a curious user to get started with his "Hello World" program in a matter of minutes.

Advantage :

If you didn't already know, vending machines are machines that can dispense a variety of items, including; sweets, chocolate, fruit, nuts, fizzy pop, water, tea, coffee, and more. All a customer has to do is insert a coin, type in the code to their chosen item, and then enjoy as the machine dispenses it to them! These machines have come a long way, and even offer the option to pay by card so you don't have to tip your wallet/purse upside down to find change. There are many benefits of having vending machines in your workplace; read on to find out what they can offer you:

They're Easy to Manage

These machines are so easy to manage as nobody has to be there to sell any goods. All that needs to be done is the machine's installation, and then you can simply monitor

it's progress from afar. There won't be any payment problems either, as an instant cash/card payment is needed to buy items.

No Overhead Costs

Operating vending machines carries no overhead costs as you eliminate the need for employees who sell food. You don't have to worry about monthly wages and pay rolls, and there's also no need for you to rent any extra work/office space.

You'll Keep Your Employees Fed and Watered

Your employees needn't go hungry or thirsty if they haven't brought their own lunch, as your workplace will be fully equipped with a vending machine to meet their needs.

CONCLUSION:

Vending machines have come a long way since the first holy water dispensing machine. They now offer a variety of products as well as many different types of payment options. Vending machines are accessible, affordable and convenient to use. With the many advantages vending machines bring, it definitely compensates for any disadvantages. They have been here for a long time, and will certainly advance for many years to come.

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